

Debate Continues On Whether Alum Treatments Are Worth Their Salt

Cape Cod Chronicle 13 June 2018

by: Ed Maroney

An interesting description of the salt lakes of Australia is given by a writer in the Sydney Empire, who... says... “Mounds of earth... can be seen for miles. The water is clear and soft. It is impregnated with magnesia, soda and alum. It is very palatable to drink, and I think very wholesome...”

The Chatham Monitor, Oct. 25, 1871

Alum treatments, which have been used to improve pond health on Cape Cod by reducing the effects of phosphorus, remain controversial.

In Orleans, the marine and fresh water quality committee is recommending an application of aluminum salts for Uncle Harvey's Pond, where blue-green algae known as cyanobacteria produce toxins and have prompted closures by the board of health. The committee cited alum's lower costs over aeration or dredging as well as the expectation of better performance and lower maintenance than aeration.

Not so, Jim McCauley, a former president of the Orleans Pond Coalition, told selectmen June 6. Noting that he was speaking for himself and that “my comments do not in any way reflect the opinions of OPC,B” McCauley urged the town “to move slowly in embracing the use of alum in our freshwater ponds. While the scientists assure us alum is safe...I share the concerns of many citizens who are uncomfortable with using potentially toxic chemicals in our ponds.”

Citing his background as a founder of PharmEcology, “the nation's leading authority in advising industry on properly managing pharmaceutical waste,” McCauley said that “low pH environments are known to lead to free aluminum ions, recognized by the EPA as a neurotoxin” and that “the scientists who are embracing alum have done little to address these concerns.”

In his report to the committee, Ed Eichner of the UMass Dartmouth School for Marine Science and Technology wrote that alum applications are a well-established lake management technique employed for more than 40 years and approved by the state Department of Environmental Protection. He cited successful applications in more than 10 Cape ponds.

Chatham treated two ponds with alum in 2010. “Based on the data collected during and after alum treatments in Lovers Lake and Stillwater Pond, we would consider it a success,” Dr. Robert Duncanson, director of health and natural resources, replied to an email inquiry. “Since the treatment, we have

not experienced the conditions that were present before the treatment.” He said there are no plans for other alum treatments in Chatham at this time. The applications were monitored for the town by David Mitchell, a certified lake manager. In October 2010, he told The Chronicle the process was “not cheap, there's no doubt about that, but if it's done well it can have a very dramatic effect, because it goes right to the basis of the reason why you have algae.” The treatments were expected to last at least 15 to 20 years.

The 2010 Chronicle story noted a “well-publicized treatment of Hamblin Pond in Barnstable in 1995 (that) caused a large fish kill because of a pH imbalance. That pond is now very healthy, Mitchell said, but subsequent alum treatments have been done much more slowly and with careful monitoring. Among the Cape ponds treated recently were Ashumet Pond, Mystic Lake, and most recently, Long Pond. Last summer, water clarity in Long Pond was reported to be the best it's been in around 15 years.”

A Cape Cod Commission report, “Cape Cod Freshwater Ponds Restoration Projects,” records an alum treatment of Long Pond, which sits in Brewster and Harwich, in 2007 and notes “lake clarity improved” and “no adverse effects on lake biota.”

Harwich plans to treat Hinckleys Pond with alum, probably this fall, according to Natural Resources Officer Heinz Proft.

In 2013, the Chatham Conservation Commission denied a request from the Fox Run Homeowners Association to use alum as part of a multi-pronged approach to improving Fox Pond. That part of the decision was supported by the DEP when it overruled Chatham's denial of other methods such as hydroraking. At the time, Duncanson said the town had more data on Stillwater Pond and Lovers Lake before it considered options such as alum, and that those ponds were significantly larger than Fox Pond.

In his critique last week of plans to use alum in Uncle Harvey's Pond in Orleans, McCauley said the town should suspend studies of Crystal Lake and Pilgrim Lake and “engage Dr. Ken Wagner to prescribe the appropriate level of upfront study required for the solutions we're considering.” He added that he does not know Wagner personally and that they “disagree on the question of using alum in our ponds.”

In 2016, Wagner, water resources manager for Water Resources Services, Inc., updated the town of Barnstable on several bodies of water that had been treated with alum. His report on Hamblin Pond, which received treatment in 1995, noted that it was “the first aluminum treatment on Cape Cod and only a handful of treatments had been performed in New England at that time. Dose determination and maintenance of a desirable pH range were not as advanced as they later became, and a fish kill was caused by elevated pH

and aluminum concentration. Nevertheless, the desired phosphorus inactivation occurred and Hamblin Pond experienced 18 years without algae blooms. Cyanobacteria were rare, oxygen increased in deep water, and clarity was much increased.”

Things went well into the 18th year of treatment, according to Wagner, when the effects of “upward migration of phosphorus that was not inactivated from under the zone of treatment influence” began to support algae blooms. A second aluminum treatment in 2015 “is considered to be a major success,” Wagner wrote, “with reduced phosphorus, increased water clarity, elimination of cyanobacteria blooms and increased oxygen in deeper water. Desirable conditions can be expected for the next two decades.”

The outcome was less clear at nearby Lovells Pond, which was treated in 2014. Wagner wrote that “both human use of Lovells pond and its ecological health have been improved, and benefits are expected to last for more than a decade, but the results are not as spectacular as in some other treated Cape Cod lakes, most notably Hamblin Pond.” The most plausible explanation, he noted, was “release of phosphorus from decaying organic matter,” which reduced water clarity and increased algae growth in the summer months. “Continued monitoring to document conditions, focusing on phosphorus, algae and clarity, is recommended for at least the summer months,” Wagner advised.

In his remarks to the Orleans selectmen last week, McCauley cited Barnstable's Mystic Lake, which he said “was treated with alum in 2009 and it's again showing signs of stress, supposedly because they didn't use enough alum in the treatment.”

Wagner's report to the town of Barnstable this year noted that the treatment (in September 2010) did lead to a decline in phosphorus concentration, “but was not as pronounced as desired. A combination of lower than recommended dose, due to regulatory constraints, and lower efficiency of treatment in late summer after so much phosphorus had already been released from the sediment, was suspected as the cause. Yet blooms of potentially toxic cyanobacteria were reduced and water clarity improved overall.”

Additional application of aluminum to Mystic Lake “could provide further benefit,” Wagner wrote. “Any additional treatment should be planned through more extensive sediment sampling to evaluate both the target area and the dose. Underdosing, as was mandated by permitting for the 2010 treatment, should be avoided.”

Another option, according to Wagner, “is to add oxygen to the deeper waters without destratifying the lake...oxygenation would both reduce internal

loading and greatly enhance deep water habitat. It would improve other aspects of water quality as well, if affordable.”

Andrew Gottlieb, executive director of the Association to Preserve Cape Cod, said that alum treatment tends to be “nothing better than a Band-Aid” on a problem that needs a comprehensive plan to manage water quality. “In and of itself, it's not the solution,” he said. Alum doesn't address nitrogen, the other nutrient needed by algae.

The association doesn't have an official position on alum treatment, but APCC director of science programs Dr. Jo Ann Muramoto isn't a fan. “What if it provides a short-term fix while longer-term fixes are being pursued?” she asked in an email. “The problem is that it will remain in the pond indefinitely and potentially cause problems through resuspension, ingestion by benthic life, remobilize if pH drops, etc”

John Jannell, the Orleans conservation agent, said in an email reply that alum “has never been used in an Orleans pond before. If we do get a filing, it will be the conservation commission's responsibility to thoroughly vet the proposal before issuing an Order of Conditions.”